

HYDRO-POLITICS AND STRATEGIC REALIGNMENT: THE FARAKKA BARRAGE AND PAKISTAN–BANGLADESH RELATIONS

Sajeel Ahmad^{*1}, Dr. Asia Karim², Muhammad Ali Hayat³

^{*1,3}M. Phil Scholar, Riphah Institute of Public Policy, Pakistan

²Assistant Professor, Riphah Institute of Public Policy, Pakistan

Corresponding Author: *

Sajeel Ahmad

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ABSTRACT

The Farakka Barrage, built by India in 1975 on the Ganges River, roughly 18 km upstream from the Bangladesh border, remains the most contested hydro-political infrastructure in South Asia over the last five decades. This paper scrutinizes the environmental, economic, and geo-political implications of the Farakka Barrage for Bangladesh, exploring how the unilaterally diverting Indian water has harmed the environment of southwestern Bangladesh, increasing salinity in the Sundarbans, severely damaging the agricultural economy of the country, and affecting the livelihoods of nearly 30 million people in Bangladesh. Based on the principles of the Hydro-Hegemony Framework (Zeitoun & Warner, 2006), international water law such as the 1997 UN Watercourses Convention, and based on analysis of hydrological data, treaty documents, and diplomatic records, the paper evaluates the effectiveness of the 1996 Ganges Water Treaty which is to expire by December 2026 and argues that it has systematically favored India at the cost of Bangladesh. Contextualizing the dispute, the paper positions the Farakka dispute in the wider hydro-hegemonic behavior of India in the context of South Asia and its pattern of behavior under the Indus Water Treaty towards Pakistan. This article makes a unique argument on the effect of the Pak-Bangla strategic alignment after August 2024, as it examines the post-August 2024 Pakistan-Bangladesh rapprochement from a perspective of mutual water disputes with India and how common issues of water-related issues in India's water diplomacy have influenced the ties. Ultimately, the paper calls for regional multilateralism and internationalization of South Asian transboundary water disputes and enhanced Pakistan-Bangladesh collaboration in hydro-diplomacy in South Asia.

Keywords: Farakka Barrage; hydro-hegemony; Pakistan–Bangladesh relations; Ganges Water Treaty; transboundary water governance; South Asian geopolitics; international water law

1. Introduction

Water has long been recognized as an element of international relations; however, the theoretical study of water as a weapon of strategic power politics in the context of South Asian geopolitical dynamics is still underdeveloped. The Ganges River is one of the largest transboundary water systems in the world, with flows through India and Bangladesh, supporting about 451 million people in its basin (Mirza, 2004). The commissioning of the Farakka Barrage by India in 1975—purportedly

designed to flush the Hooghly River with adequate flows from the Ganges, in order to maintain the navigability of Kolkata Port—has had significant long-term implications for downstream Bangladesh. The barrage is situated only 18 km from the international border and diverts large volumes of the Ganges water during the dry season (the lowest period of river flows), an event that has been described as an ecological and humanitarian catastrophe without parallel by Bangladeshi

scholars (Kawser & Samad, 2016; Rahman & Rahaman, 2018).

This controversy over the hydro-political issue of Farakka Barrage predates the institutionalization of Bangladesh as an independent country. As early as 1951, Pakistan lodged formal protests against India's development of the barrage as the diversion of water upstream threatened the existing ecological and economic viability of East Pakistan (Crow et al., 1995). Post-1971, the argument was elevated from a bilateral Indo-Pakistan conflict to a Bangladesh-India conflict, but the essential features—an imbalance in asymmetrical relations of power, where the upper riparian state is in a dominating position over the lower riparian state—have remained remarkably unchanged for seven decades (Hanasz, 2017; Zeitoun & Warner, 2006). India has historically always been in a position of geographic and material power asymmetry, which has enabled it to set the rules of the game of water sharing to its advantage. Bangladesh, being a lower riparian country with a power disadvantage, has been unable to resist inadequate compromises (Thomas, 2017).

The article argues that the Farakka Barrage conflict cannot be fully understood without reference to India's pattern of hydro-hegemonic behavior in South Asia in general. India, as an upper riparian state in the Indus River Basin with respect to Pakistan and as an upper riparian state in the Ganges-Brahmaputra-Meghna basin with respect to Bangladesh, has used water diplomacy practices that show a tendency to exploit its geographical advantages to obtain benefits that are disproportionate to the total resources obtained by all states in shared water basins (Earle et al., 2015). The article contends that rather than solving the substantive issues faced by Bangladesh, the 1996 Ganges Water Treaty cemented India's hydro-hegemonic tendencies (Thomas, 2017; Rahman et al., 2019). A novel contribution is a critical analysis of the rapidly growing Pakistan-Bangladesh strategic alignments after the political upheaval of August 2024. The removal of Sheikh Hasina and the formation of a temporary government led by Nobel laureate Muhammad Yunus represented a sea change from the erstwhile

pro-Indian position of Bangladesh to a more diversified global engagement (Sitaraman & Banerji, 2025). This article contends that a shared grievance against India's hydro-hegemonic approach is an emerging but necessary basis for Pakistan-Bangladesh cooperation and contributes to a wider understanding of South Asian strategy literature in the context of hydro-politics.

2. Theoretical Framework

The analytical framework for this study is built largely on Zeitoun and Warner's (2006) Framework of Hydro-Hegemony (FHH). The FHH is a potent analytical tool for exploring how asymmetry of power plays out in the realm of transboundary water relations, identifying three fundamental pillars through which a state maintains its hegemonic control over water resources: its riparian position (an upstream or downstream advantage), its material power (military and economic strength, and technological capacity), and its potential for appropriation (infrastructure and technical capabilities for altering shared water resources) (Zeitoun & Warner, 2006). The position of India in the Ganges basin contains all three elements: the state enjoys an upstream riparian advantage, possesses an overwhelmingly superior material power vis-à-vis Bangladesh, and has undertaken massive engineering projects to significantly alter the hydrological regime to the disadvantage of downstream Bangladesh (Zeitoun & Allan, 2008). Furthermore, the FHH identifies mechanisms of hydro-hegemony such as capture (appropriation of water resources through infrastructural development), containment (preventing the articulation of claims from co-riparian states by ensuring favorable bilateral agreements), and incorporation (bringing downstream states into decision-making forums in such a manner as to reproduce hegemonic relations) (Zeitoun & Warner, 2006; Warner, 2008). In addition to the FHH, principles of international water law, especially doctrines of equitable and reasonable use of international waters (enshrined in the UNWC, 1997) and prevention of significant harm to other states sharing an international water resource (McCaffrey, 1996; Salman & Uprety,

1999), are used to set a benchmark for India's actions. It is important to note that India has not ratified the UNWC of 1997 and generally prefers bilateral relations where it holds a strong bargaining advantage-actions that are entirely consistent with the hydro-hegemonic playbook of Earle et al. (2015). In addition, the analysis incorporates the framework of three-dimensional power developed by Lukes (2005) and expanded upon by Zeitoun and Allan (2008) for use in hydro-political contexts, encompassing coercive power (forcing compliance), bargaining power (shaping agreement outcomes), and ideational power (framing the issues, setting the agenda, and defining legitimate solutions). India's hydro-hegemony over the Ganges is exercised in all three domains: it uses coercive power to implement its infrastructure plans unilaterally, bargaining power to influence the outcomes of bilateral negotiations, and ideational power to frame its water diversion activities in terms of maintaining the navigability of Kolkata port rather than as a strategic move to extract water from downstream Bangladesh (Hanasz, 2017).

3. Literature Review

3.1 *Scholarship on the Farakka Barrage and the Ganges Dispute*

Farakka Barrage has drawn wide academic significance across the disciplines of hydrology, environmental science, international law and political science, but it has been sectoral fragmented, without a common geopolitical framework linking Bangladesh's experience to Pakistan's parallel complaints. Sharing the Ganges, Crow et al. (1995) have documented the basic political history of the dispute in great detail: *The Politics and Technology of River Development*, tracing the barrage's origins in the colonial period through its commissioning and early effects, noting that Pakistan protested the barrage as early as 1951 and that Bangladesh inherited a structurally disadvantaged negotiating position upon independence. A landmark article in *Bandung: Journal of the Global South* by Kawser and Samad (2016) synthesized the political developments around Farakka and documented its adverse environmental effects on Bangladesh

and concluded that the dispute has never been adequately addressed through the bilateral mechanisms India has preferred. Their work remains the most comprehensive political-historical account of the barrage dispute, and is a point of departure for this study.

With respect to the hydrological and environmental aspects, Mirza (1998) presented the first rigorous quantitative analysis of the link between the Farakka diversion and salinity increases in the downstream rivers of Bangladesh, and found a statistically significant causal link. Mirza's edited volume (2004), *The Ganges Water Diversion: Environmental Effects and Implications*, compiled a multi-disciplinary body of evidence on environmental consequences for Bangladesh. Rahman and Rahaman (2018) extended this work with the most comprehensive hydrological study to date, covering 80 years of discharge data for the pre- and post-Farakka periods, and found reductions of 23–65 percent in dry season flows at Hardinge Bridge. Gain and Giupponi (2014) demonstrate that the barrage fundamentally changed the hydrological thresholds regulating ecological function in the Lower Ganges River Basin. The cascading effects of the Sundarbans ecosystem have been documented by Rahaman et al. (2018) and Islam et al. (2016) with dramatic increases in salinity and loss of mangroves, with the latter noting that nearly 45 percent of Bangladesh's mangrove wetlands have disappeared within three decades. Rahman et al. (2010) observed the Sundarbans tree stock degradation for five decades. Khalequzzaman (1994) documented the link between altered flood regimes and broader environmental degradation in Bangladesh. Together, these works provide definitive scientific evidence that the Farakka Barrage has caused serious and measurable environmental damage to Bangladesh.

In terms of legal and institutional dimensions, Nishat and Faisal (2000) assessed the institutional mechanisms governing water negotiations in the Ganges-Brahmaputra-Meghna system, and identified the lack of enforcement authority of the Joint Rivers Commission as a critical structural weakness. Salman and Uprety (1999) compared

the laws of Mahakali and Ganges Treaties and found that both reflected India's capacity to customize the terms of the treaty to its advantage. Salman (1998) considered the 1996 Treaty specifically in the context of international watercourses law, noting its departure from the principles of equitable utilisation. Rahaman, (2009) reviewed the principles of transboundary water resources management against the Ganges Treaties, and found systematic gaps. Most importantly, Thomas (2017) performed an operational performance assessment of the 1996 GWT, using a mixed-methods analysis of 20 years of cooperation data, showing that India withdraws water unilaterally during the critical dry season, despite formal treaty compliance. The legal analysis was deepened by Ahmed and Parvin (2018) through investigating the potential role of the UN Watercourses Convention in strengthening water-sharing agreements. Rahman et al. (2019) reaffirmed Thomas's results with quantitative analysis, demonstrating that the treaty systematically underestimates climate variability and upstream abstraction, resulting in frequent dangerous low-flow events in Bangladesh. Hossain (1998) places the Ganges treaty within the broader history of Bangladesh-India relations, noting its inherently asymmetric character.

3.2 Scholarship on the Indus Waters Treaty and Pakistan's Water Insecurity

The literature on the Indus Waters Treaty offers an important comparative analytical framework to understand India's hydro-political conduct as a regional pattern, rather than a bilateral-specific phenomenon. Alam (2002) challenged the 'water wars' rationale through a case study of the IWT, arguing that the historical survival of the treaty should not be taken as evidence of inherent cooperation but of the specific institutional conditions, in particular World Bank mediation, under which it was negotiated. The World Bank as mediator and guarantor was central to neutralizing India's material power advantage, a structural advantage absent in the bilateral India-Bangladesh context (World Bank, 1960). Earlier, Salman and Uprety (1999) had pointed out structural parallels between the Indus and Ganges

treaties, both of which reflected India's ability to exploit its upstream riparian position in bilateral negotiations to contain downstream claims. Pandey (2014) put IWT conflicts in the wider context of India's behavior on transboundary water resources in South Asia, finding persistent patterns of unilateral infrastructure development and opposition to third-party adjudication. The latest and most comprehensive scholarly analysis of IWT negotiations is offered by Ranjan (2025), who traces the geopolitical and technical disputes over the Kishanganga and Ratle projects and culminating in India's unprecedented suspension of the treaty in April 2025. Ranjan's analysis is particularly relevant for the current study because it confirms that India's tendency to weaponize the IWT as a coercive diplomatic instrument sets a very disturbing precedent for Bangladesh before the GWT expires in December 2026.

3.3 Scholarship on South Asian Hydro-Politics and Regional Geopolitics

At the regional level, Earle et al. (2015) presented the most thorough overview of transboundary water management principles in South Asia, suggesting that India's strong influence over bilateral arrangements inherently places weaker riparian countries at a disadvantage and concluding that only basin-wide cooperation frameworks can result in fair distributions. Hanasz (2014) offered a significant contribution through the examination of the roles of international actors in the Ganges-Brahmaputra region, positioning India's water diplomacy within the broader trend of unilaterally implemented infrastructure projects and diplomacy used as an element of containment. Building on his previous work, Hanasz (2017) characterized India as a hydro-hegemon within the entire Ganges-Brahmaputra problemshed, stating that bilateral agreements function as a mechanism of containment against claims made by downstream riparian states. In his 2006 analysis, Bandyopadhyay focused on challenges to water management within the Ganges-Brahmaputra basin throughout post-independence South Asian geopolitics and contextualized the Farakka dispute within the broader discourse of hydrological

nationalism. Problems impeding regional cooperation on water management in South Asia were documented by Crow and Singh (2000), highlighting India's unwavering tendency to utilize bilateral frameworks over basinwide approaches as an aspect of its strategy for maintaining a structural advantage. McCaffrey (1996, 2007) provided the essential foundation in international water law in the light of which India's actions can be normatively evaluated, delineating the principles of equitable utilization and no significant harm as an imperative to which all riparian states are subject.

3.4 Scholarship on Pakistan-Bangladesh Relations and the Post-2024 Geopolitical Realignment

Although limited by the historically problematic and limited sanctioned ties between Pakistan and Bangladesh since 1971, scholarly literature concerning the two countries' bilateral relations is still somewhat sparse. Sitaraman and Banerji's 2025 piece was the most recent, and perhaps most relevant, policy analysis of the quickly shifting relationship after Hasina's fall from power, directly referring to India-Bangladesh water-sharing issues as a key part of the context for the shift in Bangladesh's approach to security: 'A number of developments, including India's increasingly close partnership with the current Bangladesh regime and its growing influence over Dhaka, and also the current disputes over water sharing with India...' They were not just writing policy analysis on Pakistan-Bangladesh relations, but a chapter in a larger field of policy analysis discussing post-2024 South Asian geopolitical reordering. Almost no existing literature explicitly connects Pakistan and Bangladesh's hydro-political grievances against India as a structural explanation for the two states' potential rapprochement; this is exactly what this article addresses.

3.5 Identified Research Gap

The preceding review highlights three salient, intertwined and complementary gaps. Firstly, while the hydro-environmental and legal impacts of the Farakka Barrage has been exhaustively examined within the Bangladesh-India bilateral

arrangement, the barrage has failed to be contextualized within the continuing Indian hydro-hegemonic behavior within the Indus basin, which displays the internal structural logic of India's water diplomacy vis-a vis all of its lower riparian neighbors. Secondly, while the security and trade aspect of the new Pakistan-Bangladesh strategic cooperation have been sufficiently elaborated upon analytically, the hydro-political dimension of this developing realignment has been virtually overlooked. Thirdly, no existing scholarly effort has articulated hydro-political cooperation between Pakistan and Bangladesh as a counter-structure for confronting Indian upstream hegemony. This article attempts to fulfill these three gaps by providing a comprehensive analysis, linking hydro-politics with international relations and regional geopolitics in South Asia.

4. Research Methodology

4.1 Research Design and Analytical Approach

The research design of this study is qualitative and critical interpretivist and the FHH is the main analytical lens. It is an inter-disciplinary approach using methods from political science, international relations, international environmental law and political geography to generate a multi-layered analysis of the hydro-political dimensions of the Farakka Barrage. Given the study's objectives - to critically evaluate structural power relations embedded in water sharing treaties; to track the historical development of hydro-political disagreements; and to examine a growing bilateral relationship, the hydro-political aspects of which have not been theorized previously - a qualitative approach is suitable. The analytical approach follows three stages: (1) historical-institutional analysis of the evolution of the Farakka dispute from its pre-partition origins to the successive bilateral agreements to the present treaty expiration crisis, identifying the structural patterns of India's hydro-hegemonic conduct; (2) environmental-legal analysis of the empirical evidence of the barrage's consequences against the normative standards of international water law; and (3) geopolitical analysis of the post-2024 Pakistan-Bangladesh realignment through a hydro-political lens,

identifying the structural convergence of interests between the two countries as lower riparian states.

4.2 Data Sources

The study uses four types of primary and secondary data sources. First, hydrological and environmental data. The analysis of the environmental consequences of the Farakka Barrage is based on published hydrological datasets on discharge and water level records at Hardinge Bridge station in Bangladesh, from 1935 to 2015, as compiled and analyzed by Rahman and Rahaman (2018), Gain and Giupponi (2014), and Mirza (1998, 2004). The data sets provide the empirical basis for assessments of flow reduction, salinity intrusion and ecological degradation. Hydrological records are mainly obtained from the Bangladesh Water Development Board (BWDB). Secondly, treaty texts and official diplomatic documents: the article examines the texts of the 1977 Ganges Waters Agreement, the 1983 and 1985 Memoranda of Understanding, and the 1996 Ganges Water Sharing Treaty. The text of the Indus Waters Treaty, 1960, is analyzed for comparative purposes. Third, peer-reviewed scholarly literature: identified through searches in Web of Science, Scopus, and Google Scholar using terms including 'Farakka Barrage,' 'Ganges Water Treaty,' 'hydro-hegemony,' 'Pakistan-Bangladesh relations,' and 'Indus Waters Treaty,' with only sources published in indexed academic journals or by recognized academic presses cited as scholarly authorities. Fourth, policy documents and reports: for developments after the publication cycle of the scholarly literature, especially the post-2024 Pakistan-Bangladesh rapprochement and the 2025 JRC negotiations, the study draws on policy analyses from established think tanks and reports from international organizations, including UNECE and the UN FAO.

4.3 Scope and Limitations

The research is desk-based and does not include any primary interview research or original field data collection, which would enhance the analysis with local and lived perspectives. The fast-changing nature of the Pakistan-Bangladesh relationship means that some recent developments may have been beyond the scope of

the literature reviewed. The analysis is partial in that it focuses on the Ganges and Indus basins, and does not fully engage with the complexity of South Asia's transboundary water landscape, which includes the Teesta, Brahmaputra, Meghna and many other shared rivers. The study is approached from a perspective that prioritizes the interests and experience of Bangladesh and Pakistan as lower riparian states. This analytical lens influences the understanding of the study even though verifiable hydrological and legal data are employed. Despite the limitations, the study makes a substantive contribution by integrating previously disconnected bodies of evidence within a coherent theoretical framework.

5. Historical Context: The Genesis and Evolution of the Farakka Dispute

5.1 Pre-Partition Origins and Pakistan's Early Protests

The political history of the Farakka Barrage cannot be disentangled from the partition of the Indian sub-continent in 1947 and simultaneous restructuring of sovereign rights over shared river systems. The momentum for the plan to construct a barrage across the Ganges at Farakka had begun in the post-partition period of the subcontinent. In 1951, Pakistan approached India to express its reservations regarding the proposed Barrage, knowing full well that the diversion of Ganges water would irrevocably harm the ecological systems and agricultural base of East Pakistan (Crow et al., 1995; Nishat & Faisal, 2000). Despite Pakistani protestations, which would translate into decades of downstream grievances, the government of India approved the Farakka Barrage in 1960 and the construction started in 1961 about 17 km upstream of the border (Kawser & Samad, 2016). The commissioning of the Farakka Barrage on April 21 1975 marked a turning point in the hydro-politics of the Ganges basin, and began India's unilateral withdrawal of Ganges waters without agreement with Bangladesh, which was an independent nation only four years prior. The timing of the commission was politically significant as Bangladesh was mired in political instability and the brutal assassination of Sheikh Mujibur

Rahman in August 1975 meant the new military government could not effectively mount diplomatic opposition (Kawser & Samad, 2016). On May 16, 1976, Maulana Abdul Hamid Khan Bhasani organized the historically significant Long March to Farakka that mobilized thousands of Bangladeshis and is etched as an icon of popular resistance in the national psyche of Bangladesh (Swain, 1996).

5.2 Bilateral Agreements and Their Structural Failures (1977–1996)

Subsequent to the construction of the Farakka Barrage, a number of bilateral agreements were negotiated; however, not all adequately addressed the water needs of Bangladesh. The first formal arrangement was the 1977 Agreement on Sharing of the Ganges Waters at Farakka, which was valid for five years and allocated Bangladesh a minimum flow of water, and expired in 1982. In 1983 and 1985, two memoranda of understanding

were signed with minor modifications to the 1977 framework, and were subsequently superseded in 1985. India continued water withdrawals unilaterally thereafter; and between 1989 and 1995, a minimum daily flow of 267 m³/s was observed at Hardinge Bridge on April 6, 1993; flow that was insufficient for any beneficial use (Nishat & Faisal, 2000; Mirza, 1998). India continually denied Bangladesh's attempts to raise the issue at international forums such as the 31st UN General Assembly in 1976 and the Commonwealth Heads of Government meeting in 1993; advocating the pursuit of bilateral resolution instead (Kawser & Samad, 2016; Salman & Uprety, 1999). The resistance to internationalization while advocating a bilateral strategy has been termed the 'hydro-hegemonic approach', for it denies the weaker riparian a platform from which to access neutral arbitration processes that can resolve disputes equitably (Zeitoun & Warner, 2006; Earle et al., 2015).

Table 1 summarises the key diplomatic milestones in the Farakka dispute from 1951 to the present.

Year	Event	Outcome for Bangladesh
1951	Pakistan protests proposed barrage to India	India proceeds regardless; no agreement reached
1975	Barrage commissioned; unilateral diversion begins	No bilateral agreement; Bangladesh politically weakened post-Mujib assassination
1976	Bangladesh raises dispute at UNGA 31st Session	India opposes multilateral involvement; insists on bilateral resolution
1977	Ganges Waters Agreement signed	Minimum flow guaranteed for 5 years only; expired 1982 without renewal
1983/1985	Memoranda of Understanding	Minor adjustments only; India resumes unilateral withdrawal post-expiry
1993	Record low flow: 267 m ³ /s at Hardinge Bridge (6 April)	Lowest flow in recorded history; catastrophic agricultural and ecological damage
1996	Ganges Water Treaty signed (30-year)	Formula-based sharing with no guaranteed minimum flow; expires December 2026
Aug 2024	Dumbur Dam release; Sheikh Hasina ousted	Floods destroy 1.1 million tonnes of rice; Pakistan-Bangladesh rapprochement begins
Sep 2025	JRC negotiations, New Delhi	Bangladesh's request for 40,000 cusecs minimum flow rejected by India

Jun 2025	Bangladesh accedes to UNECE Water Convention	First South Asian nation in global multilateral water governance framework
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Table 1. Timeline of Key Diplomatic Milestones in the Farakka Dispute (1951–2025). Note: Rows shaded red indicate recent deterioration; rows shaded green indicate strategic counter-moves by Bangladesh.

6. The 1996 Ganges Water Treaty: Cooperation or Capitulation?

The 1996 Ganges Water Treaty, signed on December 12 between Indian Prime Minister H.D. Deve Gowda and Bangladeshi Prime Minister Sheikh Hasina established a 30-year water-sharing agreement for the Ganges' dry season flow at Farakka. Its formula allocates water based on total availability at Farakka: when flows at Farakka are at or below 70,000 cusecs, each country receives 50 percent; between 70,000 and 75,000 cusecs, Bangladesh receives a minimum of 35,000 cusecs; and above 75,000 cusecs India keeps 40,000 cusecs and Bangladesh receives the rest (GWT, 1996). Despite being hailed in diplomatic circles as a breakthrough in regional cooperation, examination reveals a deeply flawed structure that systematically disadvantages Bangladesh through its operation.

There are three main structural shortcomings of the treaty. The first, and most significant, is the absence of any guaranteed minimum flow to Bangladesh during March-May, the most critical months of the dry season. Water scarcity is highest during these months, as are water demand for agriculture (Thomas, 2017). The formula-based sharing of resources means that as total flow at Farakka declines (as it has in the past twenty years due to upstream diversion and climate variability) so too do Bangladesh's allocations, with no floor below which flow must not fall. The second shortcoming is that the treaty fails to account for consumptive water use by India above Farakka, which has grown considerably in recent years due to widespread large-scale irrigation projects and industrial withdrawals across the Ganges basin (Hanasz, 2014; Rahman et al., 2019). Ignoring abstraction reduces the total shared resource at Farakka, while India remains compliant with the formal terms of the treaty. The third omission from the treaty is any provisions to protect environmental flows, thereby offering no measures to protect the fragile downstream

ecosystems, such as the Sundarbans, a UNESCO World Heritage Site (Gain & Giupponi, 2014).

An analysis by Thomas (2017) of hitherto unpublished hydrological data and semi-structured interviews revealed that although India ostensibly complied with the letter of the treaty, the Indian state deliberately manipulated flows during the critical dry season periods when Bangladeshi agricultural needs were greatest. Rahman et al. (2019) corroborate these findings through a quantitative analysis of twenty years of water-sharing data, noting that observed flows in Bangladesh below Farakka have been consistently about 50 percent lower than those pre-diversion, demonstrating that treaty-signing failed to restore any measure of the pre-diversion flow levels (Nishat & Faisal, 2000; Mirza, 2002). Amid growing debate surrounding the upcoming expiration of the GWT in December 2026, Dhaka submitted a proposal for a guaranteed minimum flow of 40,000 cusecs during the dry season to New Delhi at a meeting of the India-Bangladesh Joint Rivers Commission in New Delhi in September 2025, only to have the proposal rejected on grounds of Indian domestic water scarcity and political expediency. The response serves as further evidence for the pattern of hydro-hegemony identified in much of the literature, whereby India uses its internal domestic policy and political considerations as leverage to defeat downstream resource demands, exemplified by West Bengal's repeated blocking of a Teesta water-sharing treaty since 2011 (Hanasz, 2017; Earle et al., 2015). Moreover, the treaty has been roundly criticized by environmental scientists and legal experts for lacking mechanisms that would provide for the principle of equitable utilization and no significant harm, which are considered customary international law obligations owed by co-riparian states (McCaffrey, 1996; United Nations, 1997).

7. Environmental and Socioeconomic Consequences of the Farakka Barrage for Bangladesh

7.1 Hydrological Alteration and Agricultural Devastation

The environmental impacts of the Farakka Barrage on Bangladesh are devastating in terms of scale and severity. Hydrological analyses by Rahman and Rahaman (2018) on the pre-Farakka period (1935-1975) and the post-Farakka period (1976-2015) based on discharge and water level data collected at the Hardinge Bridge station show that maximum, average and minimum discharges during dry seasons (Jan-May) decreased by around 23%, 43% and 65% respectively, from the pre-Farakka baseline. The depth of the Ganges, which was about 100 feet at peak times and 60 feet during the dry season at Rajshahi before 1975, has now reduced to depths as low as 15 feet at peak times and completely dry at several places during the dry season (Gain & Giupponi, 2014). Underground water table levels have also fallen sharply. Data collected by the Barind Multipurpose Development Authority show a fall in the groundwater table to 64 feet in December 2008 and 97 feet in December 2013. Locals say it has fallen by 40 to 160 feet over 15 years. As surface flows declined, groundwater extraction was intensified to compensate, increasing its contribution as an irrigation source from 41% in 1982 to 75% by 2002. This has caused repeated failures of the Boro rice crop—a staple in the affected regions—causing repeated displacement and loss of livelihood (Kawser & Samad, 2016; Khalequzzaman, 1994).

7.2 Salinity Intrusion and Ecological Degradation of the Sundarbans

The most critical environmental impact of the Farakka Barrage on Bangladesh has been the continuous saline intrusion and subsequent degradation of the Sundarbans mangrove forest, the largest continuous mangrove ecosystem in the world that spans over 10,000 sq km, 62% of which is located in Bangladesh (Rahaman et al., 2018). The Sundarbans, a UNESCO World Heritage Site (1997) and Ramsar Wetland (1992), relies on freshwater flows into the Gorai distributary

(Ganges) which have collapsed since 1975. Mirza (1998) showed that the diversion brought about a change in the water quality regime to sulfate-chloride dominated systems with a massive impact on total dissolved solids and salinity throughout the downstream environment. The construction of the barrage reduced the freshwater flow into Sundarbans by about 65% and increased the maximum dry season salinity in the lower salinity zone from 0–10.805 dS/m pre-barrage to about 28.352 dS/m – a major change in the hydrological characteristics of the ecosystem (Islam et al., 2016; Rahaman et al., 2018). In 1959, the growing stock was 296 plants per hectare, which decreased to 144 plants per hectare in 1996 (Rahman et al., 2010). In Bangladesh, salinity intrusion is identified as a major cause of mangrove wetland loss, where nearly 45% of the mangrove wetlands have been lost in three decades (Islam et al., 2016).

7.3 Fisheries Collapse and Economic Losses

The diversion has dealt a blow to the fisheries sector. The staple Hilsa (*Tenulosa ilisha*), once one of the most valuable commercial fisheries of the Ganges basin, has nearly disappeared from the region due to degradation of breeding and nursery grounds, changing flow regimes, salinity intrusion, and sedimentation impacts (Gain & Giupponi, 2014). The decreased flow discharge in the Gorai River caused sedimentation and high salinity conditions in the southwest area, which negatively affected the fishery ecology (Mirza, 2004). Behind the Farakka Barrage, sediment accumulation is estimated at 300 to 600 million tonnes per year, disturbing deltaic sediment dynamics and undermining Bangladesh's land-forming capacity and coastal defense (Daily Star, 2025). Direct cumulative economic damages have been estimated at some \$300 million and indirect losses from migration, health impacts, lost development, etc. Could be a lot bigger. Floods destroyed 1.1 million tonnes of rice crop in 2024 alone, of which Aman harvest losses accounted for 0.7 million tonnes. The FAO estimates damages on agricultural and livestock products in Bangladesh in 2024 at \$478 million, primarily due to irregular flooding and salinity. These figures are not abstract deficits but tangible suffering, food

insecurity and involuntary displacement for the poorest communities of Bangladesh under upstream hydro-hegemony.

8. The Post-2024 Pakistan–Bangladesh Strategic Realignment: Water as a Catalyst

8.1 The Fall of Hasina and the Reconfiguration of Dhaka's Foreign Policy

The anti-government student movement over public service quotas that toppled the Prime Minister Sheikh Hasina on 5 August 2024 redefined the geopolitical topography of South Asia. Hasina's Awami League-led government pursued a broadly India-centric foreign policy, considered to be excessively accommodating to New Delhi's interests on water diplomacy, by many in Bangladesh. The interim government led by Chief Adviser Muhammad Yunus took a very different approach. Its 'friendship to all' policy resulted in diverse partnerships and a huge rapprochement with Pakistan. Yunus met Pakistan's Premier Shehbaz Sharif on the sidelines of the D-8 Summit in Cairo in December 2024, and the two pledged to build stronger ties in trade, defense and culture. Other developments of Pakistan-Bangladesh reconciliation include restoration of direct trade, despatch of 50,000 tonnes of rice from Port Qasim to Bangladesh, creation of a joint business council, removal of visa restrictions on Pakistanis, direct flights between Dhaka and Karachi restored in December 2025, the first ever visit by Pakistan's Director General of Intelligence to Dhaka in January 2025, and visit of Pakistani Foreign Minister Ishaq Dar to Dhaka in August 2025. Direct trade between Pakistan and Bangladesh rose 27 percent from August to December 2024.

8.2 Water Grievances as a Foundation for Strategic Convergence

This article argues that the hydro-political aspect of the Pakistan-Bangladesh strategic reorientation is profound, but under-researched. For decades, both countries have been living with the physical and diplomatic consequences of India's hydro-hegemony; Pakistan with India's unilateral construction of controversial dams on the western Indus River system, and the recent suspension of

the IWT, and Bangladesh with severe damage from India's Farakka Barrage, and the inadequate water-sharing agreement of 1996 with Dhaka under the IWT. The deadlock since 2011 over the Teesta River Water Treaty, stalled by the state government of West Bengal despite agreement between New Delhi and Dhaka, cemented a perception that India's bilateral water-sharing approach can no longer meet the needs of the lower riparian states. This perception was exacerbated by the floods in Bangladesh in August 2024, when its Flood Forecasting and Warning Center blamed the disaster in part on India's decision to open water from its Dumbur Dam without warning, which Bangladeshi authorities denounced as a breach of good neighborliness. These cumulative grievances over water disputes – the Farakka Barrage, the stalled Teesta treaty and the Dumbur dam, have created a groundswell of public opinion that considers India a “water aggressor” and opens up opportunities for Pakistan and Bangladesh to forge a strategic partnership on water sharing.

Both countries have common structural interests in developing the principles of international water law, multi-national frameworks for water sharing, and dispute resolution mechanisms to curb India's ability to unilaterally decide water management strategies in shared basins. Pakistan's experience of recourse to the Permanent Court of Arbitration (PCA) in The Hague for the Kishanganga and Ratle disputes, for example, provides concrete insights for Bangladesh on recourse to international legal mechanisms. Bangladesh, in turn, has offered Pakistan its pioneering accession to the UNECE Convention on Water, thus creating a multilateral platform for both to pursue their common objectives on effective water management. A wider strategic convergence between Pakistan and Bangladesh also draws on the widening engagement of China with both countries, especially its December 2024 plan to build a megadams project on the Brahmaputra river-actions that carry considerable implications for the regional hydro-political power dynamic.

9. Discussion

The discussion above points to four issues that are worthy of theorization and policy consideration. First, the Farakka Barrage crisis shows that hydro-hegemony is not solely a function of material infrastructure, but a function of the interweaving of material power, institutional design and discursive construction. India's continued dominance over the Ganges flow was not simply a function of its upstream geography and engineering capacity, but also of the construction of the 1996 GWT as a success, while substantively embedding its own preferred outcomes in its legal provisions. This discursive element-what Zeitoun and Allan (2008) termed the exercise of ideational power-has been largely unexamined in the academic literature and diplomatic narratives of the Ganges crisis, and unearthing it is important for developing counter-strategies. Secondly, the shared experiences of Pakistani and Bangladeshi vulnerability to Indian hydro-hegemony provide the basis for a strategic alliance beyond security- or ideology-based frameworks of alliance-building in South Asia. Water disputes of India and Pakistan and India and Bangladesh have been discussed separately (Salman & Uprety, 1999; Nishat & Faisal, 2000; Rahaman, 2009). The main contribution of the article has been to link these two strands of literature and to argue that Pakistan's and Bangladesh's strategic interests in overcoming India's hydro-hegemony have been structurally interlinked, providing the basis for a new way of analyzing South Asian water governance. Third, the expiring GWT in December 2026 is a historic opportunity; its simple renewal will cement the existing deficiencies for another generation, while its failure to be renewed will leave Bangladesh exposed in any way. Bangladesh's accession to the UNECE and Pakistan's rapprochement with Bangladesh open an unprecedented window in time for a radically renegotiated treaty that would institutionalize minimum guaranteed flows, incorporate environmental flows and climate-resilient features, and establish monitoring and enforcement mechanisms that are both legally sound and politically feasible (Hossain, 1998; Thomas, 2017). Finally, India's own contradiction

of demanding norms of cooperation from China in relation to the Brahmaputra River while resisting them from Pakistan and Bangladesh in relation to the Indus and Ganges rivers, respectively, undermines its claim to normative consistency and allows for coordinated counter-hegemonic responses from its downstream neighbors (Crow & Singh, 2000; Pandey, 2014).

10. Conclusion

This article has revealed how the Farakka Barrage is a physical embodiment of Indian hydro-hegemonic policies in the Ganges basin and how it has deeply and permanently affected Bangladeshi ecology, economy and its sovereign right to a fair share of water. The effects of the barrage have been numerous, including a reduction of minimum flows in the dry season by 65 percent, the disastrous extent of salinization in the Sundarbans, damage of agricultural livelihoods and fisheries in southwestern Bangladesh, and estimated damages to economy (direct) of \$300 million (indirect considerably greater), which is one of the worst examples of transboundary environmental injustices in South Asia. These damages have been well documented by Bangladeshi and international scholars, but very little consideration has been made to the impacts of these damages in the diplomatic arrangements regulating India-Bangladesh water relations.

In spite of grievances, instead of addressing them, the 1996 Ganges Water Treaty has been instrumental in consolidating asymmetrical power structures which favor India but fail to meet the water needs of downstream Bangladesh. The treaty does not even guarantee a minimum flow, does not take into account upstream water abstractions and does not even recognize the needs of environmental flow. Its susceptibility to internal politics of India and due for renewal without adequate revision reinforce FHH's argument that such treaties exist only to maintain hydro-hegemonic control not cooperation across borders. Structural similarities with the Indus Waters Treaty also underline that such Indian behavior is not an isolated case but part of a consistent strategy.

The recent strategic alignment between Pakistan and Bangladesh after August 2024 adds a potentially revolutionary new layer to the hydro-politics of South Asia. Sharing of the fate as lower riparians by both states that are systematically disadvantaged by India's upstream activities gives it an institutional basis for diplomatic cooperation not necessarily tied to security and trade issues. Accession of Bangladesh to the UNECE Water Convention, Pakistani participation in international dispute resolution mechanisms, and overall broadening of foreign policy options for both countries set conditions for concerted resistance to India's hydro-hegemonic policies, which seemed out of the question till a decade ago. This article proposes three interconnected policies, renegotiation of the Ganges water treaty based on established international water law principles which should include guaranteed minimum flow, environmental flow requirements, climate change resilient structures and independent monitoring and enforcement capabilities; extension of multilateral frameworks for South Asian water governance on the basis of Bangladesh's accession to UNECE Convention taking the models from international water law into account; and development of structured Pakistan-Bangladesh cooperation in hydro-diplomacy, building on their shared interests, complimentary strengths and rapidly strengthening bilateral relations so as to foster a more equal and sustainable method of transboundary water management. Exploitation of water as a tool of politics is a dangerous game for a region already facing the threats of climate change, increasing population and instability. Academics, policy-makers and civic activists have the duty to propose and implement alternative strategies and ways that overcome the challenges of hydro-hegemonic systems and lead to environmentally sustainable and truly multilaterally accountable water management in South Asia.

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